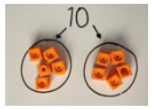
Structure and Language of Division

Division has two different structures that are explored separately.

Division as grouping:

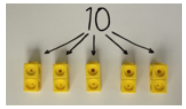
10 objects put in groups of 5



I have 20 cakes and I share them equally between five people. How many cakes will they each get?

Division as sharing:

10 objects shared into 5 groups



There are 15 biscuits and I put them into bags of five. How many bags do I need?

£480 ÷ 8 = £60

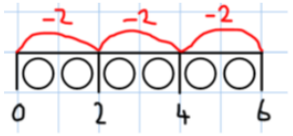
DIVIDEND DIVISOR QUOTIENT

Y1: solve one step problems involving division using concrete and pictorial representations.
Y2: calculate mathematical statements using the division sign. Show that division is not commutative.

Use grouping and sharing contexts as shown below.

Mo is putting 6 flowers into pots.

He puts 2 flowers into each pot.
How many pots does he need?



6 ÷ 2 = 3
What does each number represent?

I have 12 pennies and I divide them between 3 children.
How many 3s are there in 12?

12 ÷ 3 = 4
What does each number represent?

Dora has 10 sweets.

She shares them equally between 2 plates.

How many sweets are on each plate?

10 ÷ 2 = 5
What does each number represent?

For grouping and sharing contexts, move to a common language for division:
"How many .....s in .....?"

<u>Y3 Y4 division learning journey to 2dn ÷ 1dn/3dn ÷ 1dn</u>
The dividend at this stage will be not be greater than 20 times the divisor.

Ensure that **word problems** are in the form of **sharing** and **grouping contexts**.

1. Focus on the same times table; **link x and ÷** ; use fluency time to **focus on difficult facts** eg. 3xs, 4xs, 6xs, 7xs, 8xs, 9xs

Deepen understanding by varying the position of the empty box.

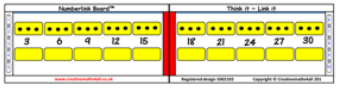
24 ÷ ☐ = 8 ☐ ÷ 3 = 8

8 = ☐ ÷ 3 ☐ = 24 ÷ 3

Using the Numberlink Board™ for Division

Before moving to division, explore multiples of 3 using multiplication.

24 = 3 x 8 24 is equal to 8 groups of 3.



What is 24 divided by three? 24 ÷ 3 = 8
How many groups of three are there in 24?

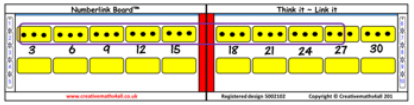
2. Explore numbers between multiples, this establishes understanding of division with remainders

"Give me a number which is 1 more than a multiple of 3."
"Give me a number which is 2 more than a multiple of 3."
"Give me a number which is 3 more than a multiple of 3.
What do you notice?"

Using the Numberlink Board™ for Division

When moving to division with remainders, explore other numbers using multiplication.

26 = 3 x 8 + 2 26 is equal to 8 groups of 3 plus two.

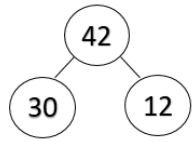


How many groups of three are there in 26? 26 ÷ 3 = 8r 2
There are eight groups of 3 and 2 remaining.

3. Move to dividends which are between 10 and 20 lots of the divisor e.g. 42 ÷ 3; 51 ÷ 3;
(These calculations will have no remainders.)

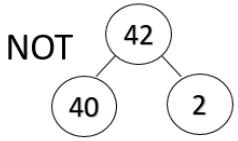
When introducing the concept, keep the divisor the same so the children focus on the changing structure.

Use the part whole model to split the dividend into ten lots of and then whatever is left.

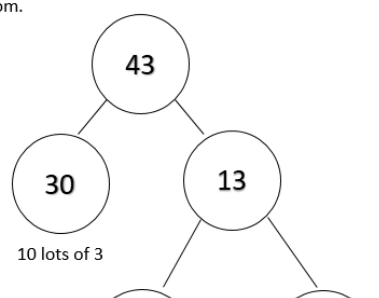


10 lots of 3 4 lots of 3

NOT



4. Repeat step 3 using numbers which are not multiples of the divisor. These calculations will have remainders.
Encourage children to explain where these remainders come from.



10 lots of 3
4 lots of 3
Remainder 1

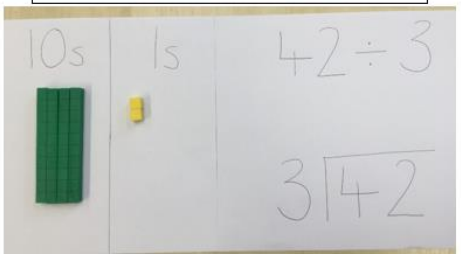
Using the short division method - exemplification of 42÷ 3

When starting to teach the short division 'bus stop' division algorithm, it is important for children to see how the written method works.

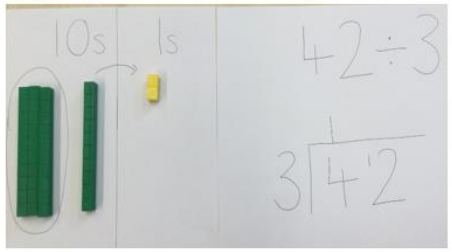
Steps to follow with Dienes:

- Put 42 ÷ 3 into a context that the children can relate to e.g. 42 children need to get into teams of 3. How many full teams will there be? Will there be any children who are not in a team of 3?
- Use the compact division method to solve the calculation, using Dienes as a support initially.

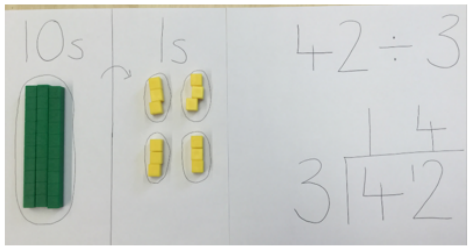
1. Start with 42 in Dienes on a place value chart as shown.



2. Ask how many groups of 3 tens there are in 4 tens. There is 1 group of 3 tens in 4 tens with 1 ten remaining. We need to rename this ten to be 10 ones. We now have 12 ones.



3. How many groups of 3 ones are there in 12 ones? We can make 4 groups of 3 ones with no ones remaining.



So there are 14 groups of 3 in 42 with none remaining.

42 is the total number of children who need to get into teams of 3.

14 represents the number of whole teams of 3 children.

There are no children who are not in a team

Steps to follow without Dienes:

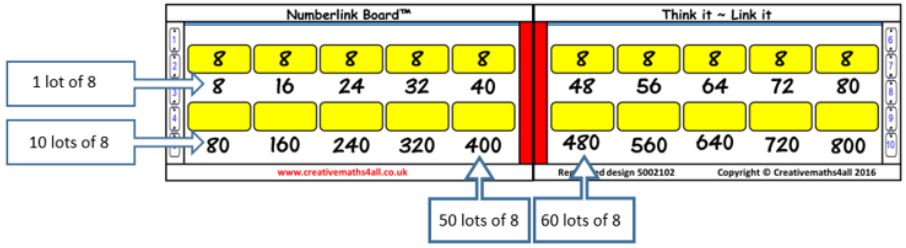
- When children are secure with how the method works using Dienes move on to using the compact bus stop method without unitizing the place values. Use the shortened form of the algorithm eg. How many 3s in 4, 1 remainder 1. How many 3s in 12, 4.
- **The children should have a good idea of what the quotient should be before using this method. They should use estimation and number sense so they can spot an error if it occurs.**
- **Make sure children know what each number in the calculation represents.**

Y5/Y6

Y5: Up to 4dn ÷ 1dn; short division method 'bus stop'; interpret the remainder
Y6: Up to 4dn ÷ 1dn; short division or long division when appropriate; interpret the remainder

Focus on a particular divisor when working on the algorithm initially. For example if using 8 as the divisor build the Numberlink Board up as shown below. The children can then find the dividend on the board and estimate what the quotient will be.

Estimate how many 8s there are in 475.



475 is between 400 and 480 so the quotient will be between 50 and 60.

Y5/Y6

$$6\overline{)1\,5^{3}8^{2}7} = 264\text{ r}3$$

Deepening understanding of division

53 apples are put into bags of 4. How many bags are filled? (13)

What happens to a group of 53 children if they are put into teams of 4? (They make 13 teams with 1 child left over: 13r1)

A roll of fabric is 53m long and is cut into 4 equal lengths. How long is each piece? ($13\frac{1}{4}$m).

£53 is shared equally between 4 friends. How much do they get each? (£13.25)

A taxi can hold 4 people. 53 people need a taxi, how many taxis will be needed? (14)

$$\begin{array}{r} 28.8 \\ 15\overline{)432.0} \\ -30 \\ \hline 132 \\ -120 \\ \hline 120 \\ -120 \\ \hline 0 \end{array}$$

150
75
15